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Factors of E-Learning System Affecting Students' Satisfaction: Empirical Evidence from Virtual Campuses of Southern Punjab

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Abstract

The advancements in technology are very rapid, the education and training are shifting from traditional classroom learning to Information Communication Technology (ICT) based, requiring self-organized, collaborative learning, with flexible timings, and consisting of the facilitators, learners and experts community. Use of internet technologies for improvement of knowledge and working performance is also included in the scenario of E-Learning. By these technologies the contents, sequence of learning, learning place and timings along-with media can be controlled, which allows them to enhance their expertise and exposure in order to meet the objectives of individual learning. In order to administer the view of resources and learning of the E-Learners technical standardization is done that creates multiple learning opportunities for researchers, faculty members to meet with continuing challenges of the world. Rapid changes in the world and new trends and innovations in E-Learning directly highlight the revolution in education that allows collaborative as well as adaptive learning that in its turn changes the task of instructors. The combination of E-Learning with education can enhance the application of learning theory for adults. It is expected that the educators were more involved in facilitation of learning and supporters of competency rather than the distributors and servers of content. In order to boost the performance as well as knowledge the emerging technologies of internet are providing a vast range of solutions. The educators of medical can also use E-Learning for enhancement of effectiveness and efficiency for emerging social, scientific challenges. In the past decade E-Learning has achieved esteem as eminent from the previous studies. However the use of E-Learning has been inconsistent amongst clinical clerkships as well as in basic sciences. Web based, computer assisted, online, internet and distributed learning all are the other names of E-Learning. However, the computer assisted learning and distance learning are termed to be two E-Learning modes as shown by the studies of the past decade. Learning assisted by computers facilitates the learners by the help of computers in the distribution of packages of multimedia in teaching and learning. Whereas, distance learning provides knowledge to the learners at remote areas from a central location.

Keywords: E-Learning, Distance Learning, Multimedia Learning, student satisfaction, Technology Learning, ICT

Introduction

People are moving towards E-Learning due to flexible time schedules and change in technology, more and more E-Learning institutions are coming into being in the world. In Pakistan, E-Learning system was introduced by Virtual University (2006) which was followed by COMSATS Virtual Campuses all over the country. Virtual Campuses have been operating in Southern Punjab

since 2008.However; no significant study has been reported to find the effectiveness and quality of E-Learning system of these campuses, although at present, almost 2000 students have been enrolled in these campuses. The people are skeptical in respect of the working of this system and its efficiency and effectiveness. The present study endeavors to fill in this gap and is geared towards investigating and highlighting the factors which affect the students' satisfaction.

Electronic Learning also known as Web based learning, distributed learning, online learning, Internet based learning or computer-assisted instruction. In the past, two E-Learning modes were used. One of them was Computer assisted Learning and the other was distance learning.

The Computer assisted mode of learning which is also known as the computer based learning or training using computers to assist in deliverance of packages of multimedia in teaching and learning. Information technology used in distance learning in order to distribute tutoring to students who are located t remote areas.

Multimedia learning is an advancement to facilitate combination of E-Learning with conventional training led by instructor, a completely new name in education but an idea well-known to most educators for instance, demonstration or lecture is complemented by a tutorial available online. Learners, faculty members as well as administrators uncover that E-Learning of multimedia improves teaching as well as learning. One of frequently cited gain of E-Learning includes ease of accessibility to available information that can be targeted as learning enhancement or learning delivery. Standardization of content, and accountability, updating existing content, personalized instruction and ease of distribution. Ease of use refers to user's knack to sort out what and when is needed.

Enhanced access to the materials of education is necessary as learning commonly is a spontaneous experience. Updating printing material is a complex procedure as compared to updating of electronic material. E-Learning technologies allow educators to modify their subject matter easily. Learners could command over the subject matter, sequence of learning, time and most often media allows adapting the experience in order to achieve objectives of personal learning.

Internet technologies permit the widespread distribution of digital content to many users simultaneously anytime and anywhere. An additional strength of E-Learning is that it standardizes course content and delivery; unlike, for instance, a lecture given to separate sections of the same course. Automated tracking and reporting of learners' activities lessen faculty administrative burden. Moreover, E-Learning can be designed to include outcomes assessment to determine whether learning has occurred. Advantages in learning enhancement are a less well recognized but potentially more revolutionary aspect of E-Learning than are those related to learning delivery. E-Learning technologies offer educators a new paradigm based on adult learning theory, which states that adults learn by relating new learning to past experiences, by linking learning to specific needs, and by practically applying learning, resulting in more effective and efficient learning experiences.

Literature Review

Learning enhancement permits greater learner interactivity and promotes learners' efficiency, motivation, cognitive effectiveness, and flexibility of learning style. Learning is a deeply personal experience: we learn because we want to learn. By enabling learners to be more active participants, a well-designed E-Learning experience can motivate them to become more engaged with the content. Interactive learning shifts the focus from a passive, teacher centered model to one that is active and learner centered, offering a stronger learning stimulus.

Interactivity helps to maintain the learner's interest and provides a means for individual practice and reinforcement. Evidence suggests that E-Learning is more efficient because learners

gain knowledge, skills, and attitudes faster than through traditional instructor-led methods. This efficiency is likely to translate into improved motivation and performance.

E-learners have demonstrated increased retention rates and better utilization of content, resulting in better achievement of knowledge, skills, and attitudes. Multimedia E-Learning offers learners the flexibility to select from a large menu of media options to accommodate their diverse learning styles.

E-Learning can help remove barriers to achievement, by providing new and creative ways of motivating and engaging pupils and learners of all abilities, enabling and inspiring everyone to attain their educational potential.

E-Learning can support learning by offering differentiated learning, particularly for those who need support in literacy, numeracy and ICT.

E-Learning offers a wide range of tools to enable teachers and learners to be innovative, creative and resourceful in all learning activities. Teachers and learners can easily customize digital learning resources to suit pace and level, appropriate to any learning style and ability.

E-Learning creates on-line communities of practice. The Internet can bring learners, teachers, specialist communities, experts, practitioners and interest groups together to share ideas and good practice.

E-Learning can provide an individualized learning experience for all learners, including those who are disadvantaged, disabled, exceptionally gifted, have special curriculum or learning needs or who are remote or away from their usual place of learning.

E-Learning can facilitate wider participation and fairer access to further and higher education by creating the opportunity to start learning and to choose courses and support according to the learners' needs.

E-Learning provides personalized learning support through information, advice, and guidance services. It can help learners find the course they need, with a seamless transition to the next stage of their learning, including online application or enrolment and an electronic portfolio of their learning to take with them.

E-Learning provides virtual learning worlds where learners can take part in active and creative learning with others through simulations, role-play, remote control of real world tools and devices, online master classes, or collaboration with other education providers.

Satisfaction

According to Oliver (1997), satisfaction is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided a pleasurable level of consumption-related fulfillment. Thus, satisfaction is captured as a positive feeling, indifference, or a negative feeling (Anderson, 1973). Tse and Wilton (1988) define satisfaction as the consumer's response to the evaluation of the perceived discrepancy prior expectations (or some norm of performance) and the actual performance of the product as perceived after its consumption (p. 204). With the rise of e-commerce, researchers introduced the concept of e-satisfaction. Hise and Szymanski (2000) define e-satisfaction as the consumers' judgment of e-service offerings in the virtual marketplace. The definition of e-satisfaction is very similar to the definition of e-service quality by Santos (2003). In the E-Learning context, a student is considered a customer of E-Learning services.

DeLone and McLean Model of Information System Success

Theories addressing the issue of accepting the information technology focus on Consumers' evaluation of the system. A model proposed by DeLone and McLean (2003) has popularly been adopted as a frame to assess the success of an information system and has been updated and

validated by a number of studies. As an updated version, DeLone and McLean (2003) Model (henceforth, D & M) consists of six components: system quality, information quality, service quality, use, user satisfaction, and net benefits. System quality, information quality, and service quality predict both use and user satisfaction. Use and user satisfaction are antecedents of impact. System quality deals with the issues such as usability, availability, reliability, adaptability, and response time (e.g., download time). These characteristics are assumed to be valued by users of a system. Information quality captures the content issues that are geared toward providing users with personalized, complete, relevant, easy-to-understand, and secure information. It was assumed that prospective users expect these information qualities in e-business systems.

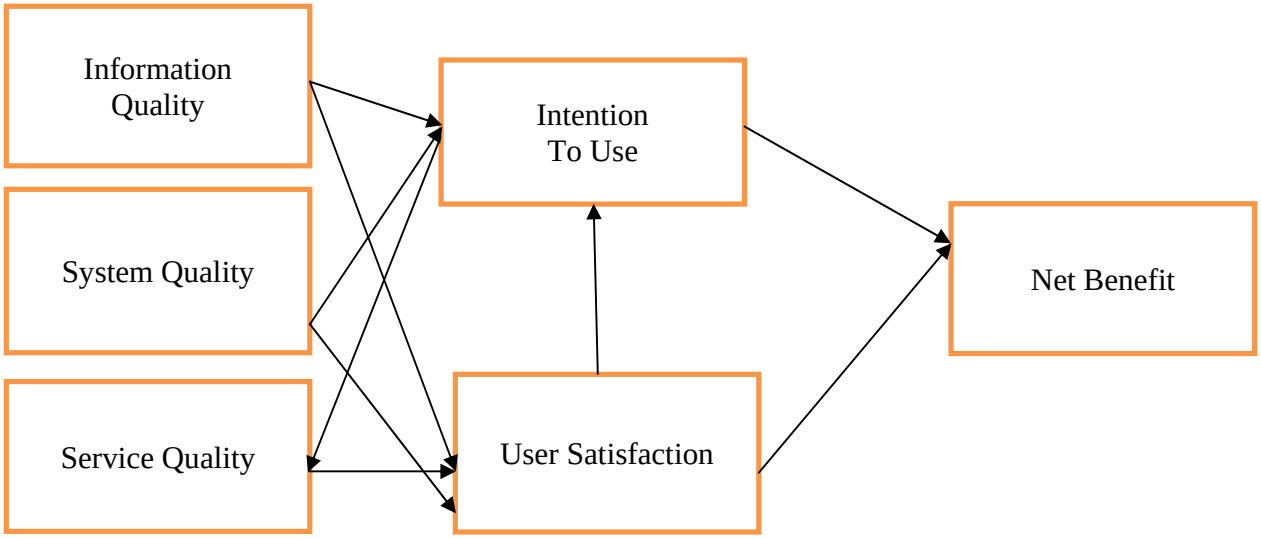

Figure 1: DeLone and McLean model of information system success. From "The DeLone and McLean Model of Information Systems Success: A ten-year update," by W. H. DeLone and E. R. McLean, 2003, pp. 9-30.

Service quality refers to the overall support delivered by the service provider. Use measures any visit to a website. It includes navigation within the site, information retrieval, and execution of a transaction. User satisfaction deals with the Information Quality System Quality Service Quality Intention to Use User Satisfaction Net Benefit Use customer experience cycle from information retrieval to purchase. Net benefits capture the balance of positive and negative impacts of the system.

Several researchers have adopted the D & M IS success model as a theoretical foundation for assessing the quality of E-Learning system and services both in the perspective of customers and in an organizational context (Chiu et al. 2005; Roca et al, 2006; Wang, Wang, &Shee, 2007). The majority of these studies used the three dimensions of IS quality as independent variables and satisfaction as a dependent variable in order to assess students' perception of satisfaction with E-Learning system/service.

Benbunan-Fich, et al. (2005) state that these types of interactions are related to the extent to which collaborative learning pedagogy is used. In this regard, researchers have come to focus on how collaborative learning contributes to educational effectiveness. Conversation, argument, and multiple perspectives that arise in groups contribute to such cognitive processes as verbalization,

cognitive restructuring, and conflict resolution. Students also can get rid of uncertainty upon complex activities and increase engagement as a result of peer interaction. It is noteworthy that Bruffee (1999) pointed out learning as a consensual process. In an earlier time, Harasim (1990) took note of collaboration, which is likely to be designed in web-based discourse environment, as a key process in conceptual change and intellectual convergence.

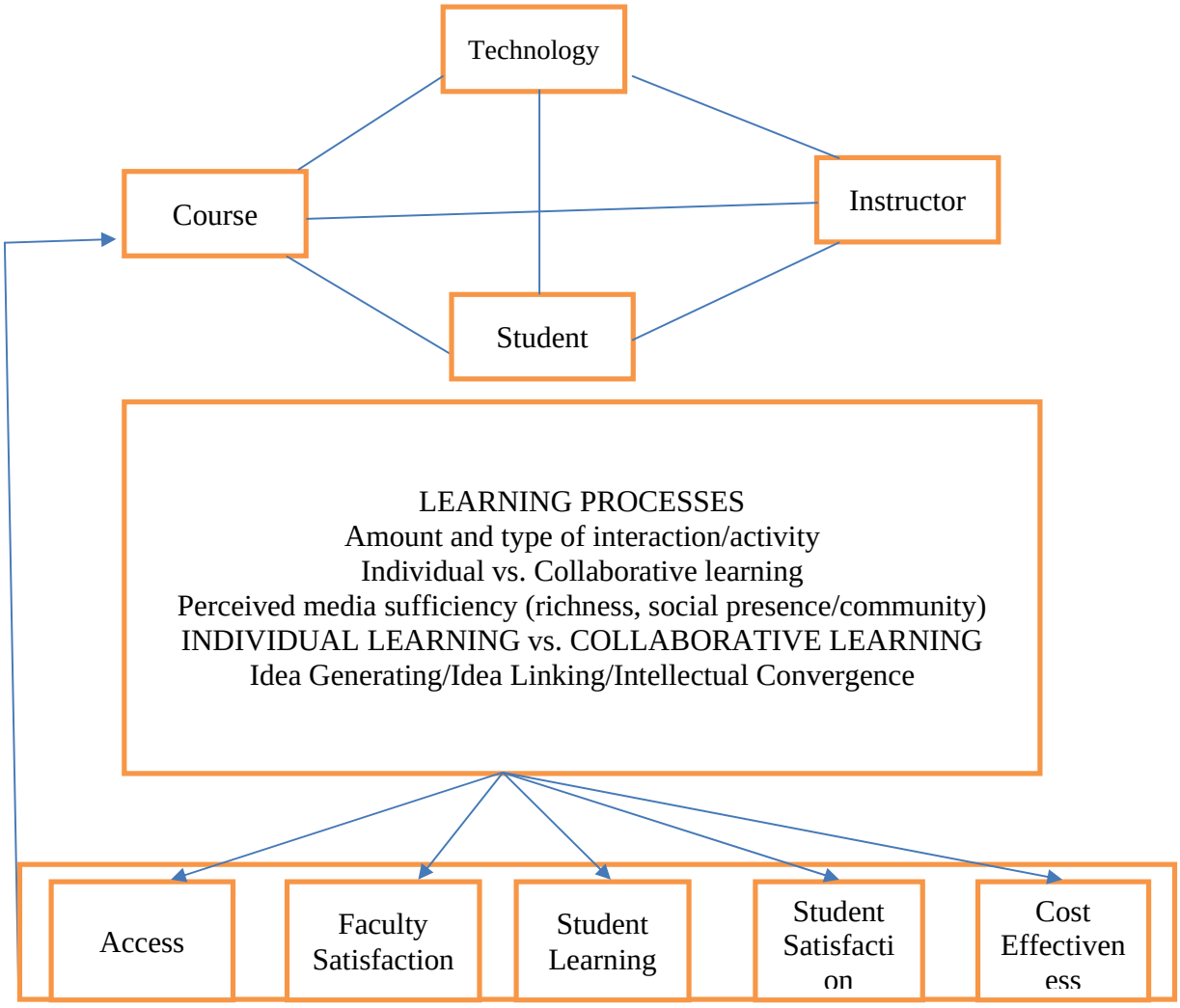

Figure 2: R.Benbunan-Fich, S. R. Hiltz, and L. Harasim, In S. R. Hiltz and R. G. Goldman (Eds.),Learning together online, 2005, Mahwah, New Jersey: Lawrence Erlbaum Associates

Therefore, according to EDT, the better the performance or the more positive the disconfirmation, the greater the satisfaction. The validity of EDT has been proved in a number of studies including studies on consumers' behavior of accepting information system (Bhattacherjee, 2001ab; Huh, Uysal, & Williams, 2003; Khalifa & Liu, 2002; Pizam & Milman, 1993).

Learner Aspect

Various studies done by different scholars like Arbaugh and Durayin 2002 and Hong, 2002 investigated that e-learner's attitude towards IT or computers are a source of measuring satisfaction

of e-learners. Attitude of a learner can be defined as a behavior of e-learner towards E-Learning system through use of computers. Computer technology is considered an important tool of E-Learning and it was investigated by different scholars that those who have attitude towards computers/IT technology are considered to be more satisfied (Arbaugh, 2002 and Piccoli et al, 2001). Instructors make their material available online and learners participate through computers. A positive attitude towards computers and when students are not afraid of using the technology will result in positive leaning as stated by Piccoli et al. in 2001. Therefore, this research considers the attitude of learners to computers an important factor in the learning satisfaction.

Anxiety expressed by learners to use the computer is a hurdle in E-Learning system. Anxiety will hinder the satisfaction level of learner. (Piccoli et al., 2001). Cattell and Scheier in 1961 stated that anxiety occurs due to mental pressure and it is of two types: trait anxiety and state anxiety. Trait anxiety is personal characteristics while state anxiety is emotional fear of causing any damage to computers etc. anxiety results from the mental pressure and is composed of trait anxiety and state anxiety. It was investigated by Igbaria in 1990 that anxiety is a hurdle of satisfaction level of e-learners. So, importance of relationship of anxiety and satisfaction level of e-learner cannot be denied. The definition of computer anxiety in this research is the anxiety level of students when they apply computers in E-Learning.

Marakas, Yi, & Johnson, investigated in 1998 that self-efficacy is the people's belief about their ability for accomplishment of tasks. Those learners who have high self-efficacy are better e-learners and are more satisfied with E-Learning system. Wang and Newlin (2002), research on 122 students, concluded that students with more self-efficacy are more likely to adopt E-Learning network and gain much better final grades. Internet self-efficacy is defined in this study as the ability of learners to assess their ability to use the Internet to conduct activities related to E-Learning.

Instructor Aspect

It was investigated by previous studies that timely response of instructor's to e-learners is a cause of motivation for e-learners to use E-Learning system and become satisfied e-learner. Soon Sook et al in 2000 investigated that tutors who are not able or do not give timely response to e-learners cause a negative effect on satisfaction level of e-learners. Arbaugh in 2002 and Thurmond et al, in 2002 argued that if tutors are able to manage timely response to e-learner's queries, satisfaction level of e-learners will improve.

The model proposed by scholars like Fulk, Schmitz, and Steinfield (1990) argues that positive attitude of instructor's towards E-Learning is a major source of satisfaction level of e-learners. If teachers have positive attitude towards computer/IT technology, then they can instill the same in students. Dillon and Gunawardena in 1995 defined that attitude of instructor's can be defined as the perception of e-learners about attitude of teachers towards E-Learning.

Course Aspect

Different scholars like Arbaugh in 2002, Taylor in 1996, Salmon in 2000, Strauss in 1996, and Arbaugh and Duray in 2002 stated that flexibility of E-Learning about in time, space and methods is a main source of satisfaction level of e-learners. In addition, removal of barriers like those students who are hesitant in face to face discussions can more easily express their thoughts and can easily interact with each other. The definition of E-Learning course is the flexibility efficiency and effectiveness of E-Learning system for learners in their work hours and perceived communication. As a result,

The quality of well-designed learning programs is the factor of precedent for learners when considering E-Learning (Piccoli et al., 2001). Scholar like Leidner and Jarvenpaa in 1995investigated that features of virtual E-Learning like interactive online discussion and

brainstorming, multimedia presentation for course materials, and management of the learning process, helps learners to develop effective models of learning and motivation lifelong learning. Therefore, the quality of E-Learning is also considered an important factor in learner satisfaction.

Hypothesis

H1 = There is association between Learner Aspect of E-Learning System and Students' Satisfaction

H2 = There is association between Instructor Aspect of E-Learning System and Students' Satisfaction

H3 = There is association between Course Aspect of E-Learning System and Students' Satisfaction

Proposed Research Model

Based on four models discussed in the literature review the proposed model is presented below.

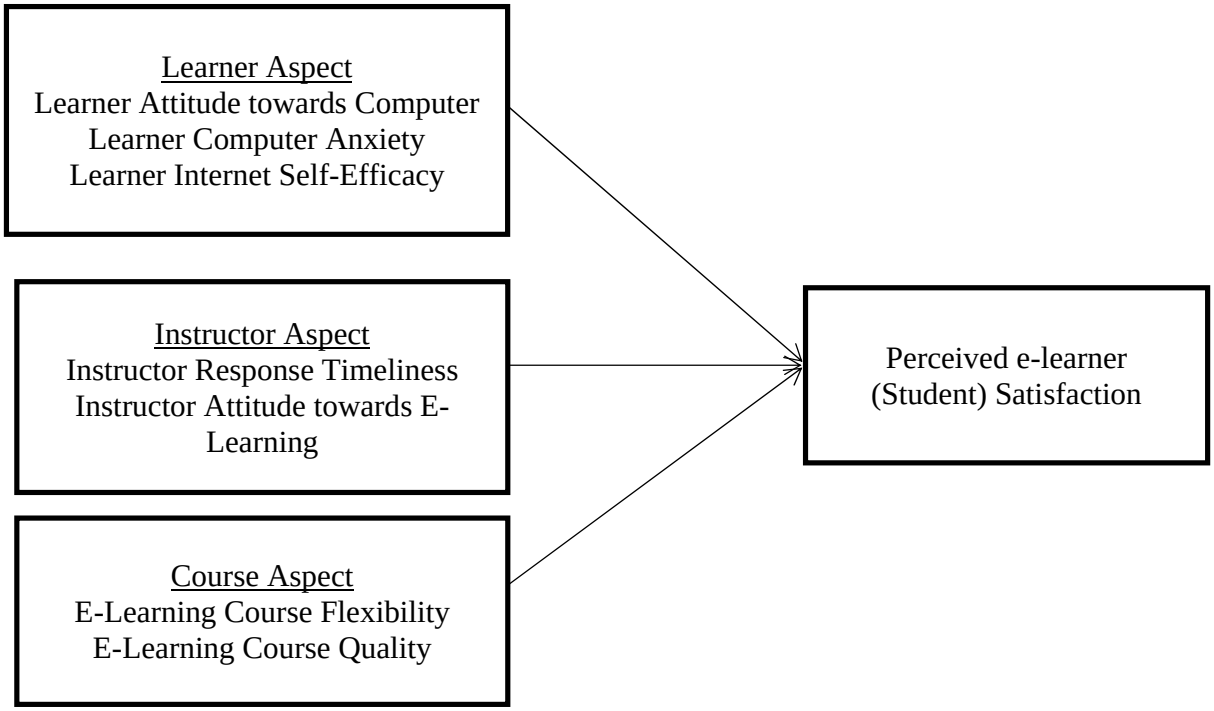

Figure 3. Proposed Research Model

Methodology

This is a quantitative study in which data has been collected through an adapted questionnaire. In social science, quantitative research refers to the systematic empirical investigation of social phenomena by statistical data, mathematical or numerical or computational techniques (Fulk, J., Schmitz, J., & Steinfield, C. W. 1990). In the quantitative research mathematical models, theories and / or assumptions are developed and used. The measurement process is at the heart of quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships.

Population and Sampling

All the students of E-Learning institutions like virtual university, COMSATS virtual campus etc. of South Punjab Multan, and Bahawalpur, Vehari were our targeted respondents. A list of respondents was generated from the referral institutions and from those lists, students were selected randomly. Sample size was selected on basis of Bentler and Chou (1980) method.

Data collection

Two types of data are mostly used in studies i.e. primary data (newly gathered data for sake of problem at hand e.g. surveys, interviews, focus group discussions etc.) and secondary data (data collected from existing sources e.g. company records, government reports, published papers, reviews etc.). For this study as questionnaire survey was used so the data for analysis is primary one. However, most part of the secondary data is being used in literature review section for developing the theoretical and conceptual frameworks.

Data collection is crucial for studies dealing with impacts. If the data collected is unreliable then it is of no use to the researchers. A structured questionnaire was used to collect the responses from the targeted sample. So, questionnaire was the research instrument. Sample size was taken 200 Students in all South Punjab. A detailed look of these aspects could be taken in the analysis & interpretation section

Data Analysis Techniques:

SPSS was used for data analysis. SEM was used as data analysis techniques.

Measurements

The constructs in this study include: learner's aspects, instructor aspects, course aspect, design aspect and environmental aspect. While dependent variable is perceived student satisfaction. Questionnaire will be prepared on a 5 point Likert Scale ranging from (1) strongly disagree to(7)strongly agree. The question items are given in Appendix A.

Results

In this the information obtained from the sample is presented in the form of frequency tables, percentages, and pie chart. The test results for the hypotheses are given at the end of the chapter. Each section below is an analysis of the responses of students to different questions.

Testing the hypothesis

This section is important phase of statistical inference. Hypothesis testing is a procedure which enables us to decide on the basis of information obtained from sample data whether to accept or reject a statement or assumption about the value of population parameter.

In this section, the data collected through the survey has been analyzed. Relationship between different attribute and different variables has been studied and conclusion have been drawn about the association between different attribute and different variable

Different statistical analysis has been performed after fulfilling and checking the necessary assumption, so that useful and reliable result can be got.

Level of significance and Critical Regions used for Person's Chi-square Test of Association

Level of Significance $\alpha = 0.05$

If P-value is greater than α we accept our null hypothesis

If P-value is less than α we accept our Alternative hypothesis

Ho=There is Association between Learner Aspect and E-Learning System Affecting Student Satisfaction.

H1=There is no Association between Learner Aspect and E-Learning System Affecting Student Satisfaction

Table 1. Relationship between Learner Aspect and E-Learning System Affecting Student Satisfaction

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Learner Aspect * E-Learning System Affecting Student Satisfaction	200	100.0%	0	0.0%	200	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5800.000[a]	841	.065
Likelihood Ratio	1271.021	841	.063
Linear-by-Linear Association	199.000	1	.000
N of Valid Cases	200		

Explanation: Relationship between Learner Aspect and E-Learning System Affecting Student Satisfaction. In Chi square test P-value is greater than α value its mean that is positive relationship between two variables.

We accept our null hypotheses because p-value is greater than α value.

Ho=There is Association between Learner Aspect and E-Learning System Affecting Student Satisfaction.

H2=There is no Association between Learner Aspect and E-Learning System Affecting Student Satisfaction

Table 2 Relationship between Instructor Aspect and E-Learning System Affecting Student Satisfaction

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Instructor Aspect * E-Learning System Affecting Student Satisfaction	200	100.0%	0	0.0%	200	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	570.457[a]	232	.054
Likelihood Ratio	376.878	232	.053
Linear-by-Linear Association	34.651	1	.000
N of Valid Cases	200		

Explanation: Relationship between Instructor Aspect and E-Learning System Affecting Student Satisfaction. In Chi square test P-value is greater than α value its mean that is positive

relationship between two variables. We accept our null hypotheses because p-value is greater than α value.

Ho=There is Association between Course Aspect and E-Learning System Affecting Student Satisfaction.

H3=There is no Association between Course Aspect and E-Learning System Affecting Student Satisfaction

Table 3 Relationship between Course Aspect and E-Learning System Affecting Student Satisfaction

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Course Aspect * E-Learning System Affecting Student Satisfaction	200	100.0%	0	0.0%	200	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1601.236[a]	696	.650
Likelihood Ratio	675.821	696	.701
Linear-by-Linear Association	48.137	1	.000
N of Valid Cases	200		

Explanation: In the above Table 3 given the relationship between Course Aspect and E-Learning System Affecting Student Satisfaction. In Chi square test P-value is greater than α value its mean that is positive relationship between two variables. We accept our null hypotheses because p-value is greater than α value.

Coefficient is a measure of Linear Association between two variables. The table below affects the variables of the study. Values of the correlation coefficient are always between -1 and +1.

Table 4. Correlation

			Learner Aspect	E-Learning System Affecting Students' Satisfaction	Instructor Aspect	Course Aspect
Spearman's rho	Learner Aspect	Correlation Coefficient	1.000	1.000**	.980**	.865**
		Sig.(2-tailed)	.	.	.000	.000
		N	200	200	200	200
	E-Learning System Affecting Students' Satisfaction	Correlation Coefficient	1.000	1.000	.880	.96
		Sig.(2-tailed)	.	.	.000	.000
		N	200	200	200	200
	Instructor Aspect	Correlation Coefficient	.980	.980	1.000	.605
		Sig.(2-tailed)	.000	.000	.	.000
		N	200	200	200	200

Interpretation

When comparing the correlation between two items, one item is called the "dependent" item and the other the "independent" item. The goal is to see if a change in the independent item (which is usually an indicator) will result in a change in the dependent item (usually a security's price). This information helps the researcher to understand an indicator's predictive abilities.

The correlation coefficient can range between ±1.0 (plus or minus one). A coefficient of +1.0, a "perfect positive correlation," means that changes in the independent item will result in an identical change in the dependent item. A coefficient of -1.0, a "perfect negative correlation," means that changes in the independent item will result in an identical change in the dependent item, but the change was in the opposite direction. A coefficient of zero means there is no relationship between the two items and that a change in the independent item will have no effect in the dependent item. A low correlation coefficient (e.g., less than ±0.10) suggests that the relationship between two items is weak or non-existent. A high correlation coefficient (i.e., closer to plus or minus one) indicates that the dependent variable (e.g., the security's price) will usually change when the independent variable (e.g., an indicator) changes.

In the light of the above analysis the following results are found.

Coefficient of correlation between Learner Aspect of E-learning system and students' satisfaction is positive.

Correlation and coefficient of correlation between Instructor Aspect of E-learning system and students' satisfaction is positive.

Correlation & coefficient of correlation between Course Aspect of E-learning system and students' satisfaction is positive.

Conclusion

The students have other learning ways by encompassing e-learning innovations and technologies. The market places where divergent problems and ambiguities are present are often assisted by e-learning in meeting the changing demands where market place assists them in meeting the changing demands. Practical steps should be taken by the Universities in order to meet the requirements of the students, similarly the higher education commission ought to find innovative ways in order to continue the viable edge by introducing new services and technologies. Beyond the structure and framework of the conventional classrooms, introduction of e-learning resources and tools might be one of the way that could assist students in acquiring the numerous learning goals of communication, investigation as well as collaboration. Our research is preliminary an investigation for the factors that influence the e-learning systems, as well as seeking information about fact which has not been tested yet in the study domain literature.

Limitations and future research design

There are certain limitations of this study. The relatively sample size may not be completely representative of the majority of students of E-learning programs at virtual campus in Punjab. Additionally, the main campus of Virtual in Multan and Lahore was selected but his may not reflect the results of the whole Virtual campuses. For future point of view, one can consider the students of other campuses and sub campuses of Virtual Campus, especially those established in small and underdeveloped cities in order to find out their satisfaction levels toward distance learning. Secondly, to explore the reasons why students select E-Learning for higher education in Pakistan is also an important issue for future research studies.

As results for this research, there is a list of limitations for adopting of e-learning in Pakistan especially virtual campus in southern Punjab universities

Process of integration of the e-learning system is still at the beginning.

E-learning systems within the Pakistan universities are almost not used as it proposed to be used.

The instructors teaching load is high and thus slow down the adoption of e-learning system.

The limited budgets and experts of such projects lead into implementation delay, insufficient training, and late adoption.

Most of the Learning Objects of e-learning is not tested well.

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